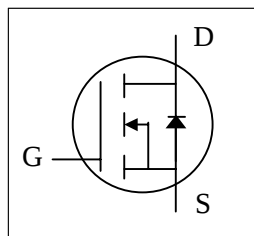
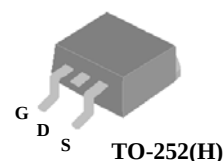


- ▼ 100% R<sub>g</sub> & UIS Test
- ▼ Simple Drive Requirement
- ▼ Fast Switching Characteristic
- ▼ RoHS Compliant & Halogen-Free



|                     |     |
|---------------------|-----|
| BV <sub>DSS</sub>   | 30V |
| R <sub>DS(ON)</sub> | 5mΩ |
| I <sub>D</sub>      | 63A |



## Description

XP3N5R0A series are innovated design and silicon process technology to achieve the lowest possible on-resistance and fast switching performance. It provides the designer with an extreme efficient device for use in a wide range of power applications.

The TO-252 package is widely preferred for all commercial-industrial surface mount applications using infrared reflow technique and suited for high current application due to the low connection resistance.

## Absolute Maximum Ratings@T<sub>j</sub>=25°C(unless otherwise specified)

| Symbol                                | Parameter                                  | Rating     | Units |
|---------------------------------------|--------------------------------------------|------------|-------|
| V <sub>DS</sub>                       | Drain-Source Voltage                       | 30         | V     |
| V <sub>GS</sub>                       | Gate-Source Voltage                        | +20        | V     |
| I <sub>D</sub> @T <sub>C</sub> =25°C  | Drain Current, V <sub>GS</sub> @ 10V       | 63         | A     |
| I <sub>D</sub> @T <sub>C</sub> =100°C | Drain Current, V <sub>GS</sub> @ 10V       | 39.8       | A     |
| I <sub>DM</sub>                       | Pulsed Drain Current <sup>1</sup>          | 240        | A     |
| P <sub>D</sub> @T <sub>C</sub> =25°C  | Total Power Dissipation                    | 31.25      | W     |
| P <sub>D</sub> @T <sub>A</sub> =25°C  | Total Power Dissipation <sup>4</sup>       | 2          | W     |
| E <sub>AS</sub>                       | Single Pulse Avalanche Energy <sup>3</sup> | 61.2       | mJ    |
| T <sub>STG</sub>                      | Storage Temperature Range                  | -55 to 150 | °C    |
| T <sub>J</sub>                        | Operating Junction Temperature Range       | -55 to 150 | °C    |

## Thermal Data

| Symbol             | Parameter                                                             | Value | Units |
|--------------------|-----------------------------------------------------------------------|-------|-------|
| R <sub>thj-c</sub> | Maximum Thermal Resistance, Junction-case                             | 4     | °C/W  |
| R <sub>thj-a</sub> | Maximum Thermal Resistance, Junction-ambient (PCB mount) <sup>4</sup> | 62.5  | °C/W  |

**Electrical Characteristics@T<sub>j</sub>=25°C(unless otherwise specified)**

| Symbol                | Parameter                                      | Test Conditions                                                                             | Min. | Typ. | Max. | Units |
|-----------------------|------------------------------------------------|---------------------------------------------------------------------------------------------|------|------|------|-------|
| BV <sub>DSS</sub>     | Drain-Source Breakdown Voltage                 | V <sub>GS</sub> =0V, I <sub>D</sub> =250uA                                                  | 30   | -    | -    | V     |
| R <sub>DS(ON)</sub>   | Static Drain-Source On-Resistance <sup>2</sup> | V <sub>GS</sub> =10V, I <sub>D</sub> =40A                                                   | -    | -    | 5    | mΩ    |
|                       |                                                | V <sub>GS</sub> =4.5V, I <sub>D</sub> =30A                                                  | -    | -    | 9.5  | mΩ    |
| V <sub>GS(th)</sub>   | Gate Threshold Voltage                         | V <sub>DS</sub> =V <sub>GS</sub> , I <sub>D</sub> =250uA                                    | 1.3  | -    | 3    | V     |
| g <sub>fs</sub>       | Forward Transconductance                       | V <sub>DS</sub> =5V, I <sub>D</sub> =40A                                                    | -    | 85   | -    | S     |
| I <sub>DSS</sub>      | Drain-Source Leakage Current                   | V <sub>DS</sub> =24V, V <sub>GS</sub> =0V                                                   | -    | -    | 10   | uA    |
| I <sub>GSS</sub>      | Gate-Source Leakage                            | V <sub>GS</sub> =±20V, V <sub>DS</sub> =0V                                                  | -    | -    | ±0.1 | uA    |
| Q <sub>g</sub> (10V)  | Total Gate Charge <sup>5</sup>                 | I <sub>D</sub> =40A<br>V <sub>DS</sub> =15V                                                 | -    | 40   | 64   | nC    |
| Q <sub>g</sub> (4.5V) | Total Gate Charge <sup>5</sup>                 |                                                                                             | -    | 21   | 33.6 | nC    |
| Q <sub>gs</sub>       | Gate-Source Charge <sup>5</sup>                |                                                                                             | -    | 8    | -    | nC    |
| Q <sub>gd</sub>       | Gate-Drain ("Miller") Charge <sup>5</sup>      |                                                                                             | -    | 12   | -    | nC    |
| t <sub>d(on)</sub>    | Turn-on Delay Time <sup>5</sup>                | V <sub>DS</sub> =15V<br>I <sub>D</sub> =40A<br>R <sub>G</sub> =3.3Ω<br>V <sub>GS</sub> =10V | -    | 9    | -    | ns    |
| t <sub>r</sub>        | Rise Time <sup>5</sup>                         |                                                                                             | -    | 76   | -    | ns    |
| t <sub>d(off)</sub>   | Turn-off Delay Time <sup>5</sup>               |                                                                                             | -    | 30   | -    | ns    |
| t <sub>f</sub>        | Fall Time <sup>5</sup>                         |                                                                                             | -    | 12   | -    | ns    |
| C <sub>iss</sub>      | Input Capacitance <sup>5</sup>                 | V <sub>GS</sub> =0V<br>V <sub>DS</sub> =15V<br>f=1.0MHz                                     | -    | 1750 | 2800 | pF    |
| C <sub>oss</sub>      | Output Capacitance <sup>5</sup>                |                                                                                             | -    | 300  | -    | pF    |
| C <sub>rss</sub>      | Reverse Transfer Capacitance <sup>5</sup>      |                                                                                             | -    | 250  | -    | pF    |
| R <sub>g</sub>        | Gate Resistance                                | f=1.0MHz                                                                                    | -    | 1.6  | 3.2  | Ω     |

**Source-Drain Diode**

| Symbol          | Parameter                            | Test Conditions                                            | Min. | Typ. | Max. | Units |
|-----------------|--------------------------------------|------------------------------------------------------------|------|------|------|-------|
| V <sub>SD</sub> | Forward On Voltage <sup>2</sup>      | I <sub>S</sub> =40A, V <sub>GS</sub> =0V                   | -    | -    | 1.2  | V     |
| t <sub>rr</sub> | Reverse Recovery Time <sup>5</sup>   | I <sub>S</sub> =40A, V <sub>GS</sub> =0V,<br>dI/dt=100A/μs | -    | 11   | -    | ns    |
| Q <sub>rr</sub> | Reverse Recovery Charge <sup>5</sup> |                                                            | -    | 3    | -    | nC    |

**Notes:**

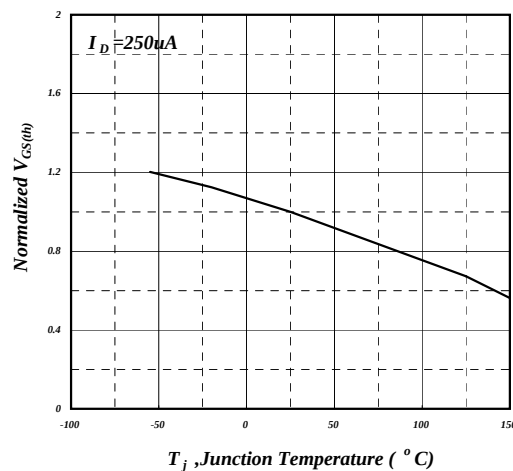
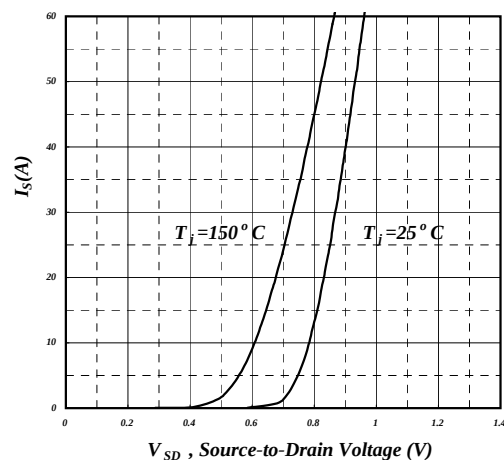
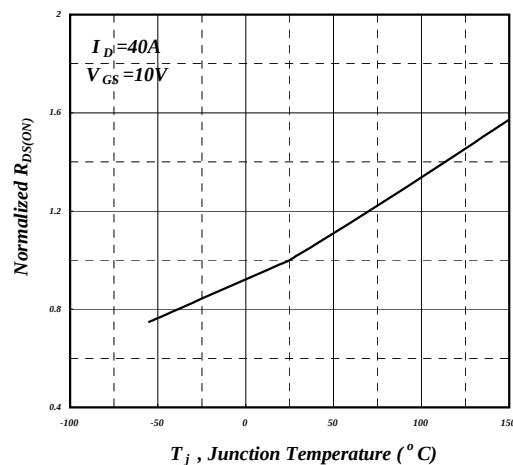
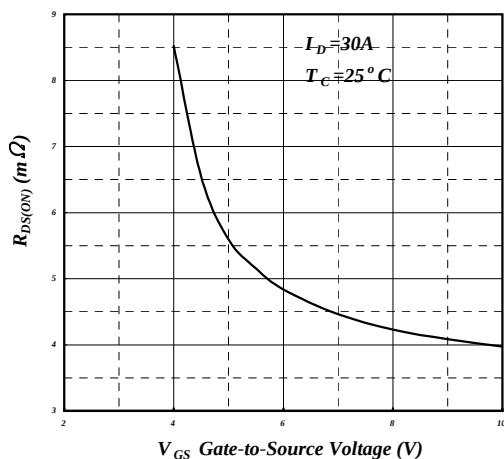
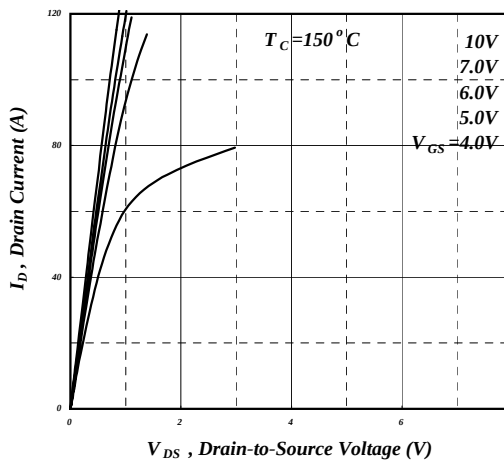
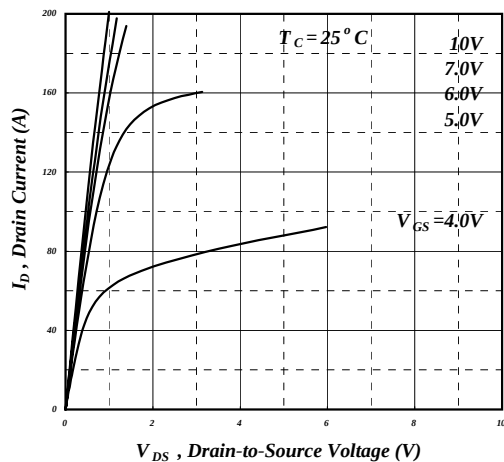
- 1.Pulse width limited by Max. junction temperature.
- 2.Pulse test
- 3.Starting T<sub>j</sub>=25°C , V<sub>DD</sub>=30V , L=0.1mH , R<sub>G</sub>=25Ω , V<sub>GS</sub>=10V
- 4.Surface mounted on 1 in<sup>2</sup> copper pad of FR4 board
- 5.Guaranteed by design.

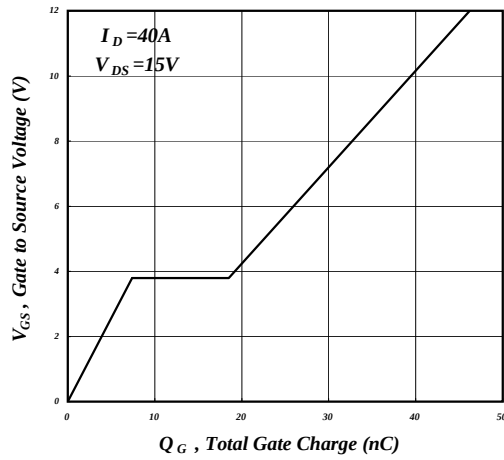
THIS PRODUCT IS SENSITIVE TO ELECTROSTATIC DISCHARGE, PLEASE HANDLE WITH CAUTION.

USE OF THIS PRODUCT AS A CRITICAL COMPONENT IN LIFE SUPPORT, AUTOMOTIVE OR OTHER SIMILAR SYSTEMS IS NOT AUTHORIZED.

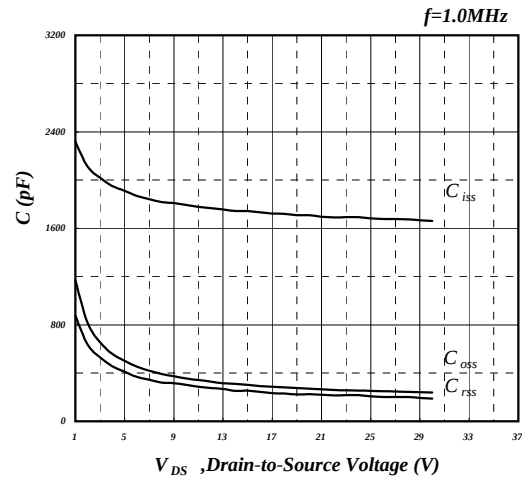
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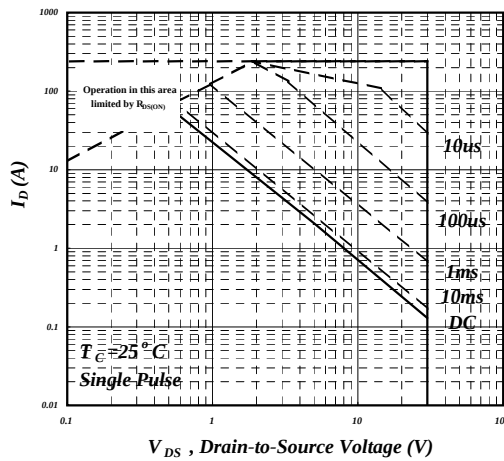




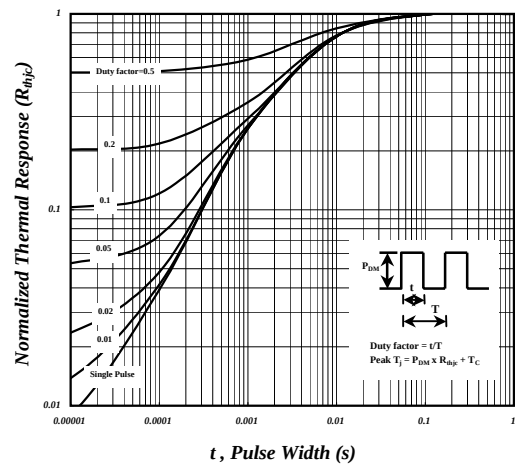
**Fig 7. Gate Charge Characteristics**



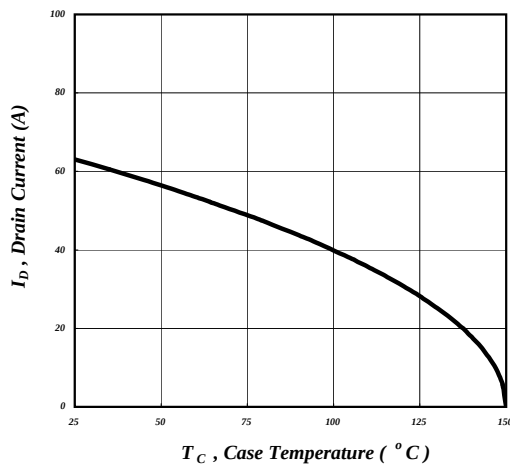
**Fig 8. Typical Capacitance Characteristics**



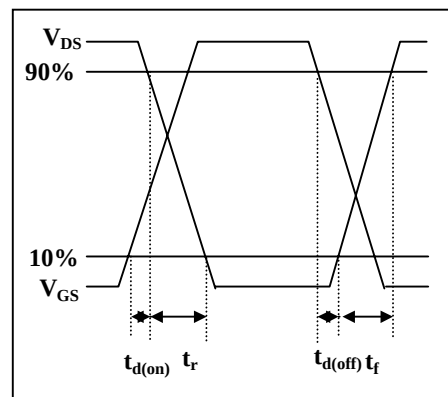
**Fig 9. Maximum Safe Operating Area**



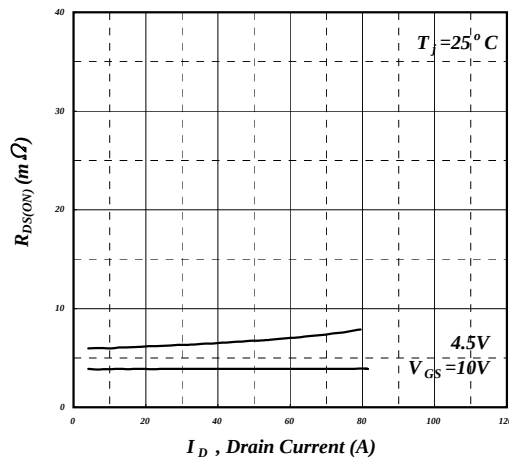
**Fig 10. Effective Transient Thermal Impedance**



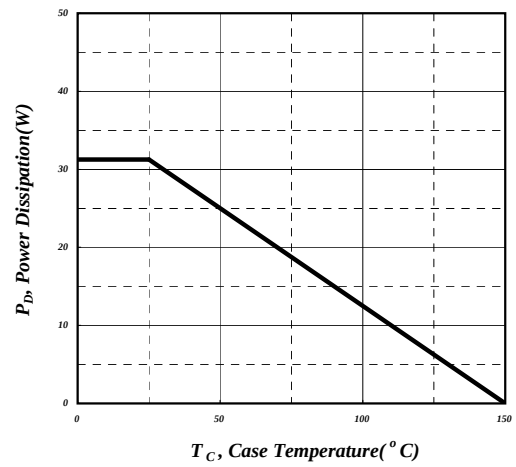
**Fig 11. Drain Current v.s. Case Temperature**



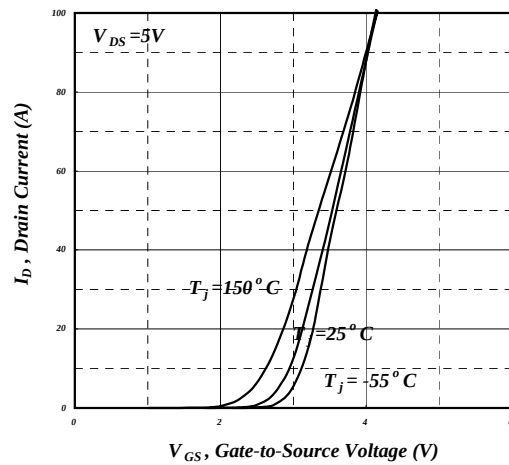
**Fig 12. Switching Time Waveform**



**Fig 13. Typ. Drain-Source on State Resistance**

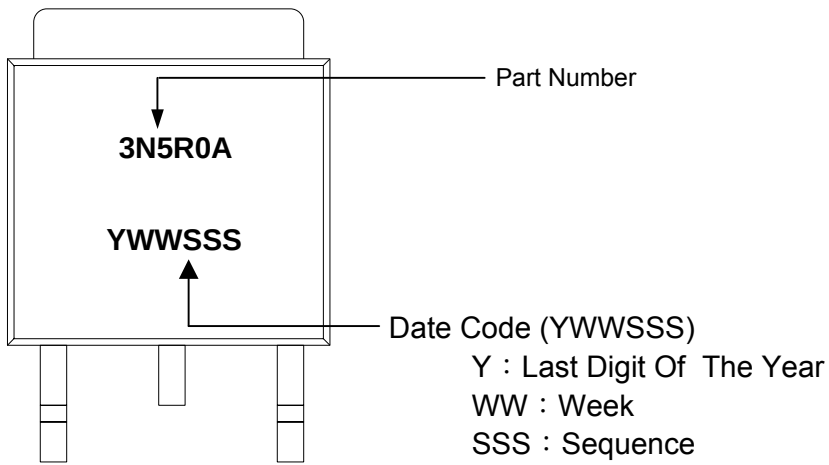


**Fig 14. Total Power Dissipation**



**Fig 15. Transfer Characteristics**

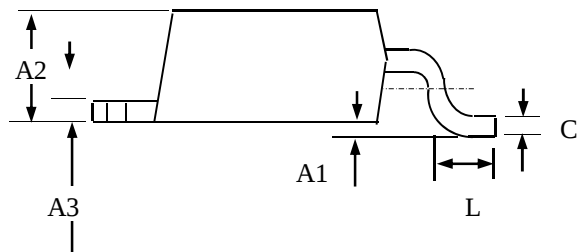
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**MARKING INFORMATION**

## Package Outline : TO-252



| SYMBOLS | Millimeters |       |      |
|---------|-------------|-------|------|
|         | MIN         | NOM   | MAX  |
| A2      | 2.18        | 2.30  | 2.40 |
| A3      | 0.40        | 0.50  | 0.65 |
| B       | 0.40        | 0.70  | 1.00 |
| B1      | 0.50        | 0.85  | 1.20 |
| D       | 6.00        | 6.50  | 6.80 |
| D1      | 4.80        | 5.35  | 5.90 |
| E3      | 4.00 (ref.) |       |      |
| F       | 2.00        | 2.63  | 3.05 |
| F1      | 0.50        | 0.85  | 1.20 |
| E1      | 5.00        | 5.70  | 6.30 |
| E2      | 0.50        | 1.10  | 1.80 |
| e       | 2.3 (ref)   |       |      |
| C       | 0.35        | 0.525 | 0.70 |
| A1      | 0.00        | —     | 0.25 |
| B2      | —           | —     | 1.25 |
| L       | 0.90        | 1.34  | 1.78 |



- 1.All Dimensions Are in Millimeters.
- 2.Dimension Does Not Include Mold Protrusions.
3. Thermal PAD, Body and Pin contour is for reference, it may has little difference by option.

**TO-252 FOOTPRINT :**

